A HIGH-STRENGTH HOOK, IN PARTICULAR FOR AN ELASTIC CABLE

B FIELD OF THE INVENTION

The present invention relates to a hook of the type having, at one end, a handle block of synthetic material shaped to facilitate taking hold of the hook and having a passage passing therethrough for receiving and retaining in the block a cable to which the hook is to be fixed.

B BACKGROUND OF THE INVENTION

Such a hook is described in publication US 5 317 788, for example.

To retain the cable in the hook when traction is applied to the cable tending to extract it from the hook, the passage tapers so as to define an abutment for stopping the end of the cable once said end has been enlarged after being passed through the passage. In the embodiment described in the above-specified publication, the end of the cable is enlarged by folding the end back onto the cable and by holding the end in place in a metal ring, and the passage through the block is designed so as to receive the enlarged end of the cable when traction is applied to the cable in a direction tending to extract it from the hook, such that the enlarged end comes to bear against the abutment which stops it (Figures 4 and 5).

When very high levels of traction are applied, that retention can be insufficient.

An object of the present invention is to improve that retaining device.

According to the present invention, this is achieved by embedding an annular metal insert in the block around said passage, in the vicinity of said taper.

In a preferred embodiment, the insert constitutes one end of reinforcement which extends over the full length of the hook, thereby further improving the strength of the hook.

B BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of such a hook is described below with reference to the figures of the accompanying drawings, in which:

· Figure 1 is a diagrammatic perspective view of the reinforcement of the hook;

· Figure 2 is a section of the hook including the axis of the passage through the handle block;

· Figure 3 is a longitudinal section of the hook fixed to a cable;

· Figure 4 is a diagrammatic perspective view of the crimped end of a cable retained in the passage of the handle block;

· Figure 5 is a perspective view of the hook provided with a safety tongue;

· Figure 6 is a view of the hook on a plane perpendicular to the plane containing the curve of the hook; and

· Figures 7 and 8 relate to detail variants.

B DETAILED DESCRIPTION OF THE INVENTION

In each case, the scale of the figures is appropriate for the corresponding explanations.

The reinforcement (A) of the hook is constituted (see Figure 1) by a rigid metal wire (A) having one end (1) curved into an upside-down J-shape and having its other end bent so as to lie in a plane perpendicular to the plane of the J-shape and curved so as to form an open or closed ring (3) therein.

The hook is preferably made of steel flat with an optionally rounded edge, the hook being formed edgewise so as to provide the greatest possible strength.

The ring (3) is substantially on the same axis as the top (S) of the curve of the J-shape and the shank (2) of the J-shape slopes slightly outwards going away from the ring.

Sub B4> This wire is placed in the cavity of an injection mold so as to be coated in a synthetic resin or some other suitable material. For this operation, it is possible for example to use polyethylene or polypropylene for conventional hooks, or a polyamide or a reinforced polymaide for hooks that need to withstand abrasion.

Sub B5> The cavity is shaped so that the injected material (M) (Figure 2) fits closely to the J-shaped portion (1) of the wire and to the shank (2), while being much

thicker around the base (2') of the shank (2) and around the ring (3) of the wire so as to provide a block (B) having a through passage (4) whose axis is in line with the top of the curve of the J-shape.

The overall thickness of the block in a plane perpendicular to the plane of the J-shape of the hook can, for example, be three to five times the thickness of the coated shank and it is four to eight times said thickness in a plane parallel to the plane of the J-shape, given the projecting portions presented by the block.

The passage (4) forms an inlet duct (4a) which is cylindrical, for example, through which the end of a cable (5), preferably an elastic cable, is inserted into the hook, and it also forms an outlet duct (4b) whose shape is frustoconical, for example, opening out so as to face the curve of the J-shape, with the junction between the two ducts forming a shoulder (4c) which constitutes an abutment.

The mold cavity is designed so that the metal wire ring (3) is completely embedded in the injected material (M) and is situated around the inlet duct (4a) close to the shoulder (4c).

Sub B6> In conventional manner, the end of the cable (5) is folded back onto itself and is crimped by means of a metal clip (6), e.g. a steel ring which is flattened after crimping. When traction is applied to the cable, this crimped end is caused to bear against the junction (4c) between the two ducts as reinforced by the ring (3) of the wire (1) (Figures 3 and 4).

The invention is not limited to using a clip for fitting to the end of the cable. It can be substituted by any means capable of maintaining the enlarged end of the cable.

The inlet edge (9) of the inlet duct (4a) is rounded so as to avoid the presence of any sharp edge which could injure the cable.

This advantage does not exist in hooks where the synthetic material is molded directly onto the cable since under such circumstances:

· the plastics material becomes embedded in the cable, giving rise to sharp edges that can injure it; and

· contact between the molten material and the synthetic covering of the cable can degrade the covering.

sub B7 > The mold cavity is designed so that the handle block (B) is of any desired ergonomic shape, e.g. having lateral recesses (a, b, c, d) enabling the hook to be held between the fingers, together with projecting portions (e, f) against which the fingers can bear. The lateral recesses can be made in portions of the block which project from the block, such as the recess (a) situated beside the shank (2).

The projecting portion (e) which faces the end (E) of the hook serves for guidance purposes while the hook is being engaged on a bar or on any other part onto which it is to be hooked.

The molded block (B) can carry a pivoting safety tongue (7) suitable for bearing against the inside of the free end (E) of the hook (Figure 5), in conventional manner.

A plug can close the inlet to the passage (4a) around the cable, thereby giving the hook a finished appearance.

The free end (E) of the hook can receive very effective protection by being coated with an extra thickness of material (Figure 7).

A ring handle (8) can be provided to make the hook easier to use in some cases (Figure 8).

The strength of the hook is such that it can receive bars of large dimensions (P) and (P_1), whereas with a standard hook these dimensions must be restricted so as to avoid weakening the ability of the hook to withstand being prized open.

Another, non-negligible advantage of the invention lies in the possibility of regularly inspecting the quality of the crimping and the quality of the elastic, which is not possible with hooks that are molded directly onto the cable.

Sub B4 > It will also be observed that the coating material does not have any holes, whereas in earlier devices, the locations of parts for holding the metal core in the mold leave said core visible at certain locations of the over-molded product, thereby requiring said locations to be provided with additional protection so as to avoid oxidation and swelling of the core, which could possibly lead to the coating being destroyed.

The invention is not limited to the embodiment described but extends to any variant that can be obtained by replacing the means described with means that are functionally equivalent.